



JdB Sound Acoustics presents

Fixing a Church in 7 days

including a day of rest

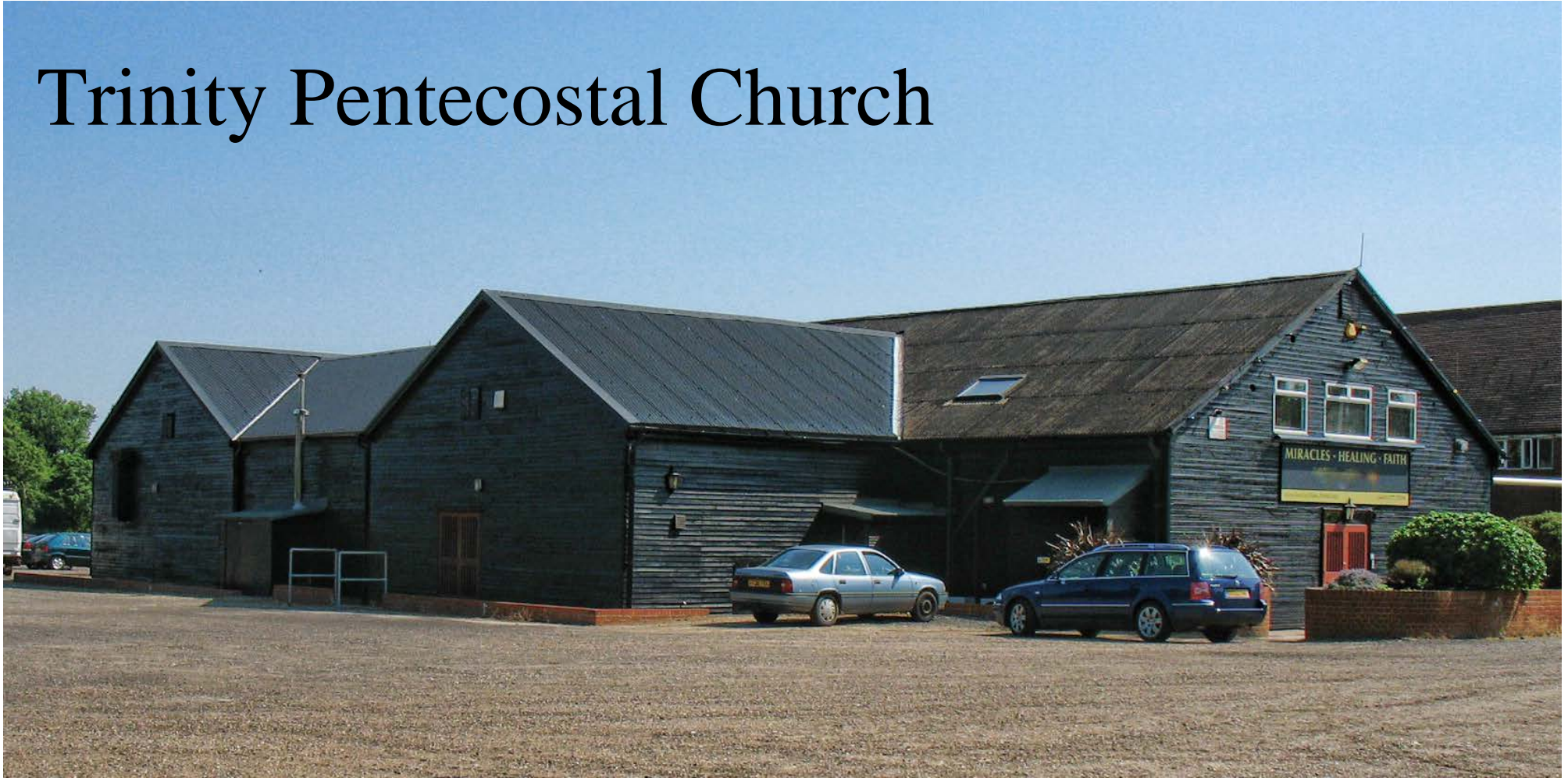
Trinity Pentecostal Church

Brentwood, England

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This is a church in a barn



The ceiling is low, 1/3rd of it is flat. It is the kind of space that gives many people in my trade nightmares and many sleepless night.

Day 1

•The day begins with interviews, a study of the plans, photos and hours listening to the room



◆ The church seating is over 800 people including the Choir

Day 1 Part 1

- ◆ This church has a TV ministry, a large music program



- ◆ There is a daily talk show, a college and it is a house of worship.
- ◆ Is it possible to convert such a challenging space into a room that is acoustical friendly for such a diverse Ministry? YES!!!
- ◆ Right from the beginning it was clear that conventional methods of room testing and study would not work. To make this room work, you have to think outside of the box.

Day 1 part 2

- ◆ What can you say. Low ceiling, low trusses, TV monitors, loudspeakers and stage lighting popping down everywhere. This room was more like a warehouse than a Sanctuary. This amazing church packs more ministry per square foot than most other church I have visited.



- ◆ Seating in the centre area of the church is flexible. This Sanctuary is used every day and on some days, more than twice. It was a real treat to be involved with such an exciting ministry

Day 1 Part 3



This church wanted a balance between a performance space and a broadcast studio. They tried acoustical curtain on the ceiling. Acoustical curtains do work but I have not been able to find a use for them in a church setting.

Day 1 Part 4

There were over 30 custom made acoustical panels – aprox. 3 x 5ft.

The fronts were 2 inch rock wool.

The backs were 4 inch coffers. These were designed and built to meet the standards used in the BBC TV studio's.

The panels were well designed and they performed as specified but again, their use in a church would be limited.



Day 1 Part 4

- ◆ These panels were in conflict with the church requirement. While they helped in some areas of room acoustics, they were a problem in other areas. These 8 inch thick panels were not aggressive enough in the frequencies that were problematic in this church.



Day 1 Part 5

- ◆ The ceiling also had a number of Rock wool Panels. All of these were removed.



Day 1 part 6

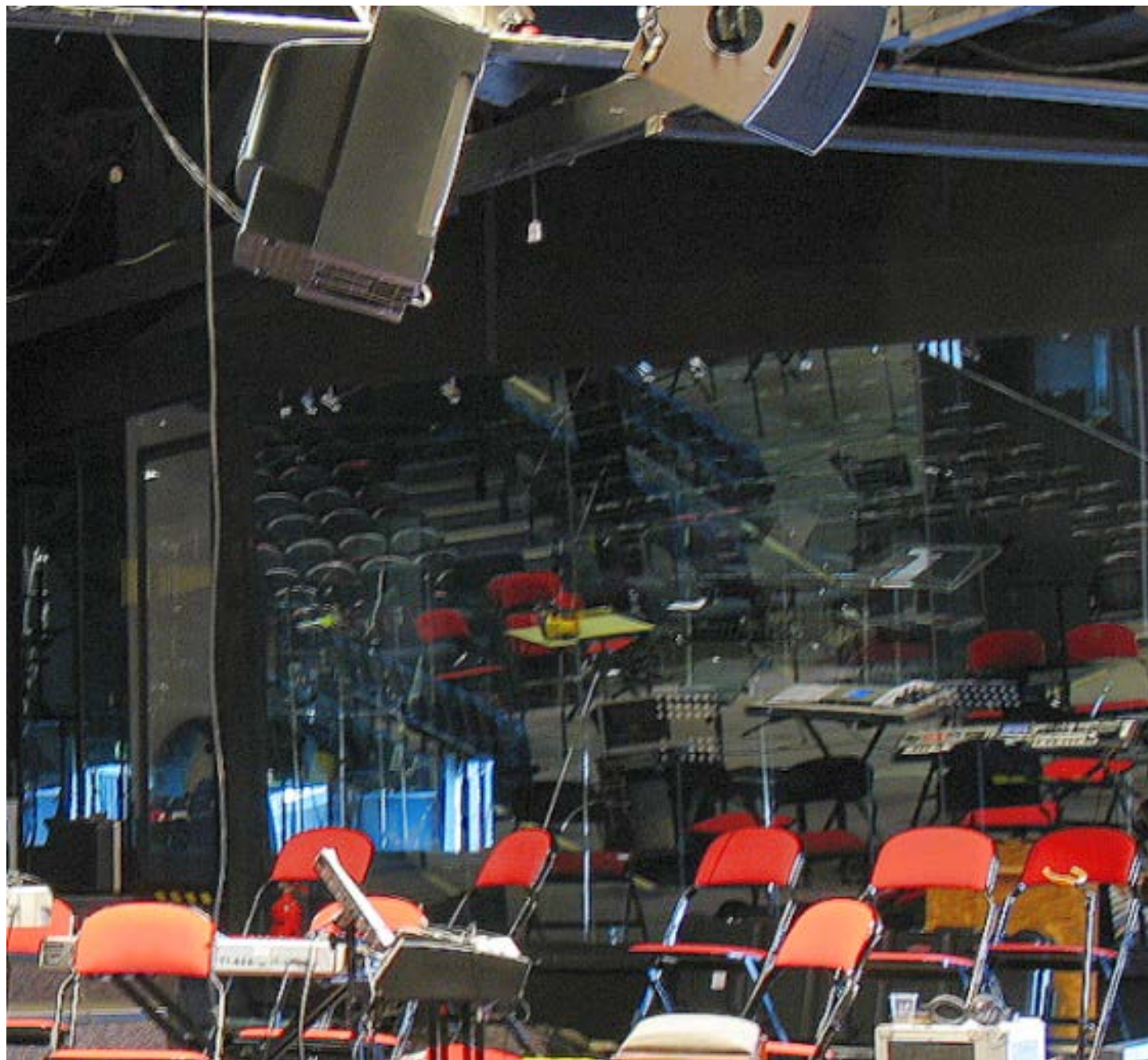
This place was panelled with wall to wall absorber panels. A short time earlier, the church members tried covering up some of the panels with plywood to try to brighten up the room.

Instead, the church found itself exchanging one problem for another.



Day 1 part 7

The problems were so out of control that the Drummer was in a glass booth inside of a larger glass booth. The first booth was for the brass instruments.



Day 1 part 8

This is the set for the daily talk show. It is part of the worship stage. Even during the interviews the people in the set sounded like they were in tin cans and the audience could not hear - even when only a handful of people were present. Hearing anything was difficult beyond 12 to 15 ft with or without the sound system on.



Day1 Part 9

Acoustics were not the only problem. In the photo below is 7 of the 16 plus speakers hung in the ceiling. Just about all of the equipment was good to high end quality and they had enough equipment to do a church seating 2000 people. All of it was reused later after the sound system was re-designed.



Day 1 part 10

- ◆ After I arrived, I learned that I was not the first Acoustical and Audio expert/contractor they hired to control their sound. I was the 10th.



- ◆ When you see all of the attempts other experts tried at the church, they followed textbook fixes correctly. If you read any books on acoustics and sound system designing, you would have seen many of the elements that were from the books and from popular teachings from Colleges, Universities and from organizations such as AES(Audio Engineering Society), AAA (American Acoustical Association) and CAA (Canadian Acoustical Association.)
- ◆ For some reason this room stumped all of the professionals the church hired and they hired some very well known experts.
- ◆ *(I'm not an expert in the classical terms. Church sound and Church acoustics are in a class by itself.)*
- ◆ The unique requirements churches have are universal to all worship spaces and are not option.
- ◆ These requirement do not apply in theatres, concert halls and recital halls where audiences are static participants.
- ◆ Many experts who work on non-church spaces usually do a superb job.

Is it Science or a **BLACK ART?**

It is all Science!

But you need to use a different set science and add other disciplines of physics to get the results all churches want and need to have for all types of worship.

Day 1 Part 11

- ◆ The first step for this project was to strip the room down and start all over again.
- ◆ All of the existing acoustical treatments and devices were removed.

- ◆ I suggested getting some Sono Tubes (construction forming tubes made of cardboard) to do an experiment.
- ◆ Some Tubes arrived the next day.
- ◆ The experiment confirmed the initial study
- ◆ The required tubes to do the whole job arrived 48 hours later.

Day 2

- ◆ Continued the study of the sanctuary
- ◆ Looked over the HAVC system
- ◆ Started the re-design of the sound system.
- ◆ Church members started removing the existing speakers system
- ◆ Made recommendation for the Video projection system
- ◆ Did study of dinning hall.
- ◆ Suggested using the panels from the Sanctuary to be installed in the dinning hall.

Day 3

Testing, Testing – This is only a Test

- ◆ The room had many sound effects. They include echo's, flutter echoes, standing waves, poor sound coverage, poor gain before feedback, low intelligibility, excess monitor spill and more. Does this sound familiar in your church?
- ◆ It should also be worth noting two things about the sound system. First it was technically installed properly. Secondly, the design of the sound system was fine for a playback system, not a sound re-enforcement system. The only changes made was to reduce the number of FOH speakers from 12 to 5 and re-configured the electronics at the mixer desk. The rest of the speakers were reused for various monitor mixes.

Day 3 Part 1

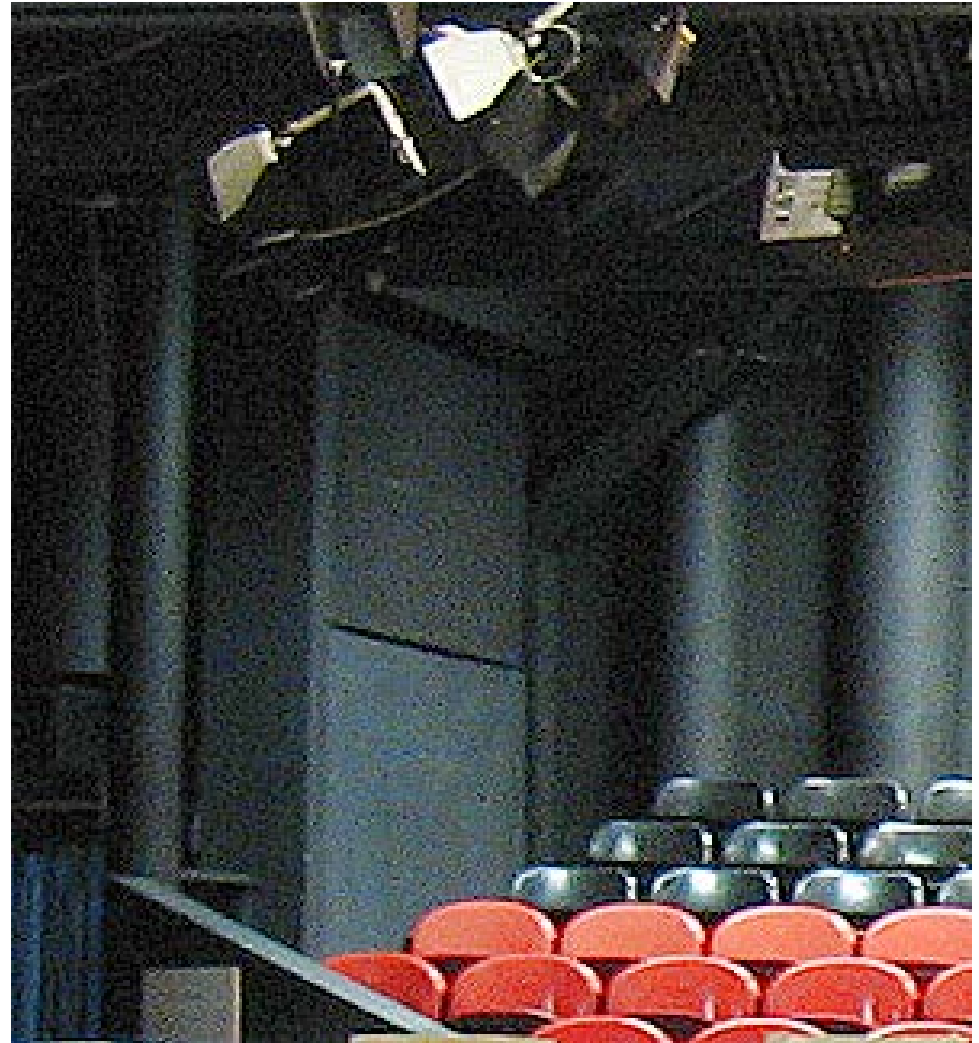
This was only a Test

Before anything was started, I asked to have a few tubes just placed against the wall in a trouble spot. Right away the sound effect was removed and it left the area sounding better. After a few more tests, the church members started a work bee that transformed the church in the next 3 days.



Day 4

- ◆ To be fair, tubes were only part of the change in this room.
- ◆ Some of the original absorbing panels were re-used, but in a different manner.
- ◆ These panels were used to manage sounds in non-active areas.
 - ◆ They were mainly used to dampen the room, not to do direct sound control.
 - ◆ Yes, there is a difference between dampening and brut for absorbing of sound.
 - ◆ It all depends on where they are placed within the room's envelop.



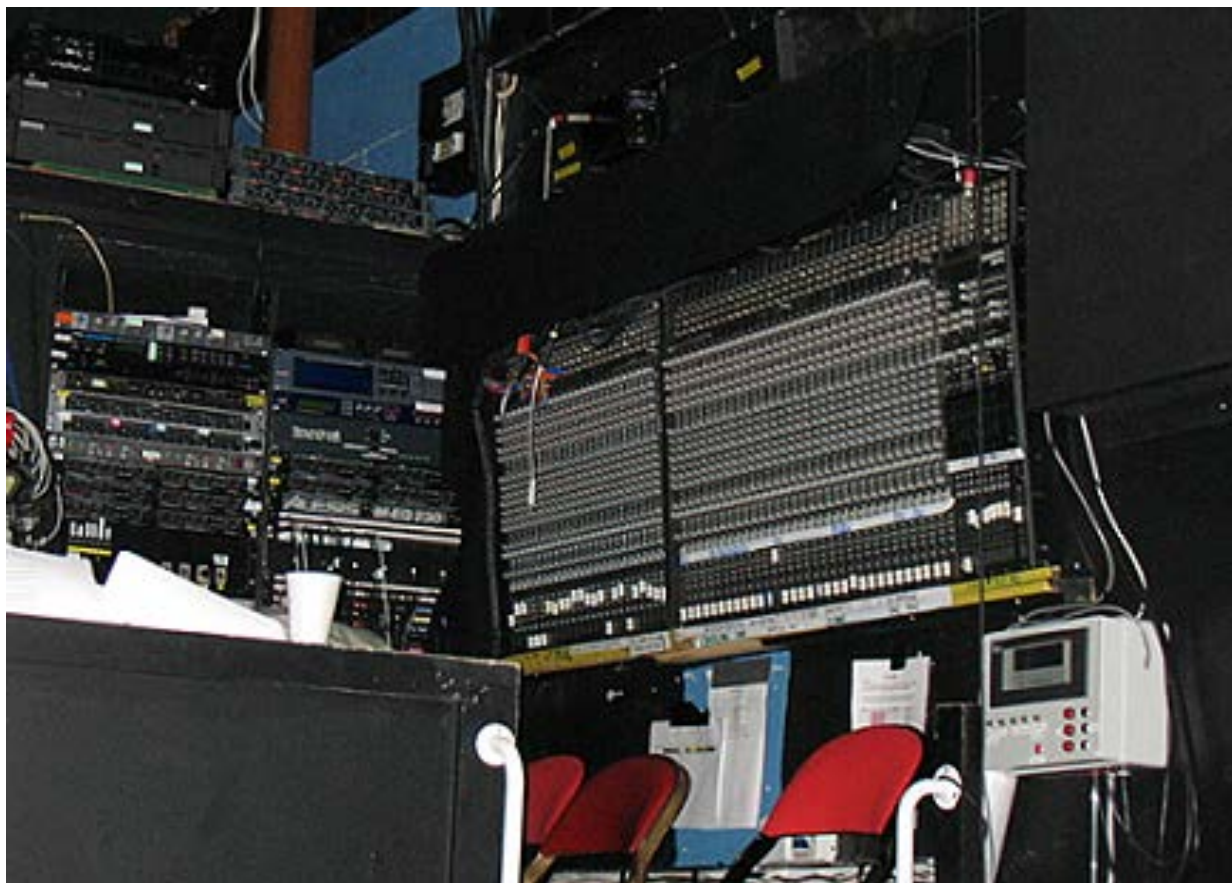
Day 5

- ◆ By the end of day 5 most of the sound system was re-installed and the tubes were laid out ready to be installed.



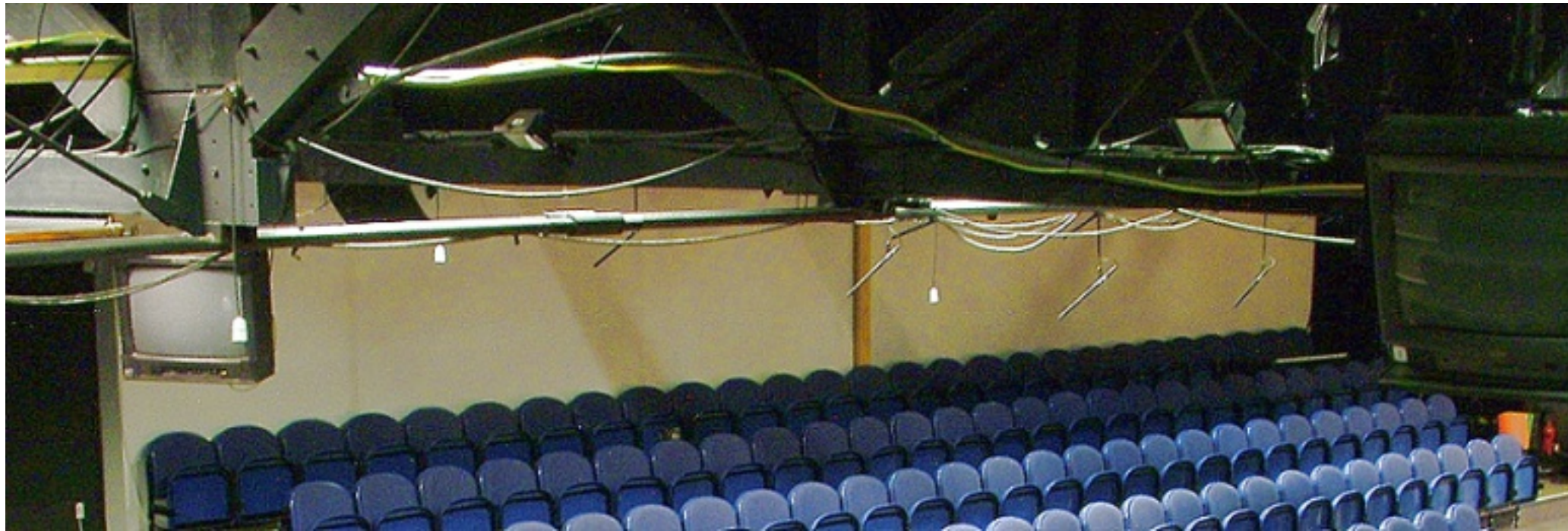
Day 5 Part 2

- ◆ Church sound systems often take on a life of their own when trying to correct an acoustical problem with electronics.
- ◆ Acoustical problems drive churches mad.
- ◆ In this case, two mixers were mounted on a wall. They were added to control everything local experts could think of in hope of getting around the acoustical problems.
- ◆ This approach does not work and it never will.



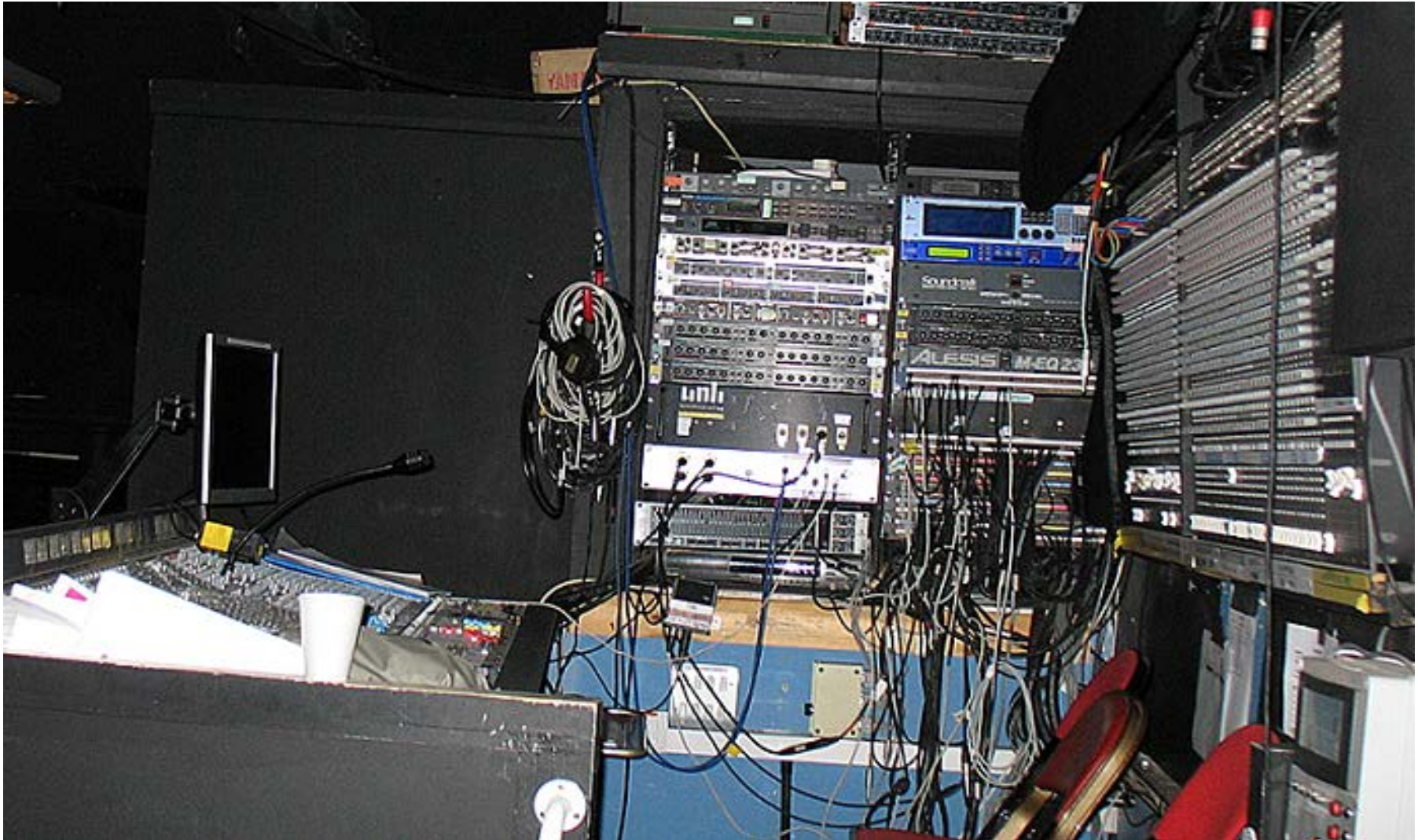
Day 5 Part 3

- ◆ This choir loft has over 12 hanging mics. This is excessive, but I do understand why this church installed them. This is how churches often try to over compensate with electronics when the room gets in the way.
- ◆ Many soundmen often wish that just once the room would take off and leave the sound system alone. :-)



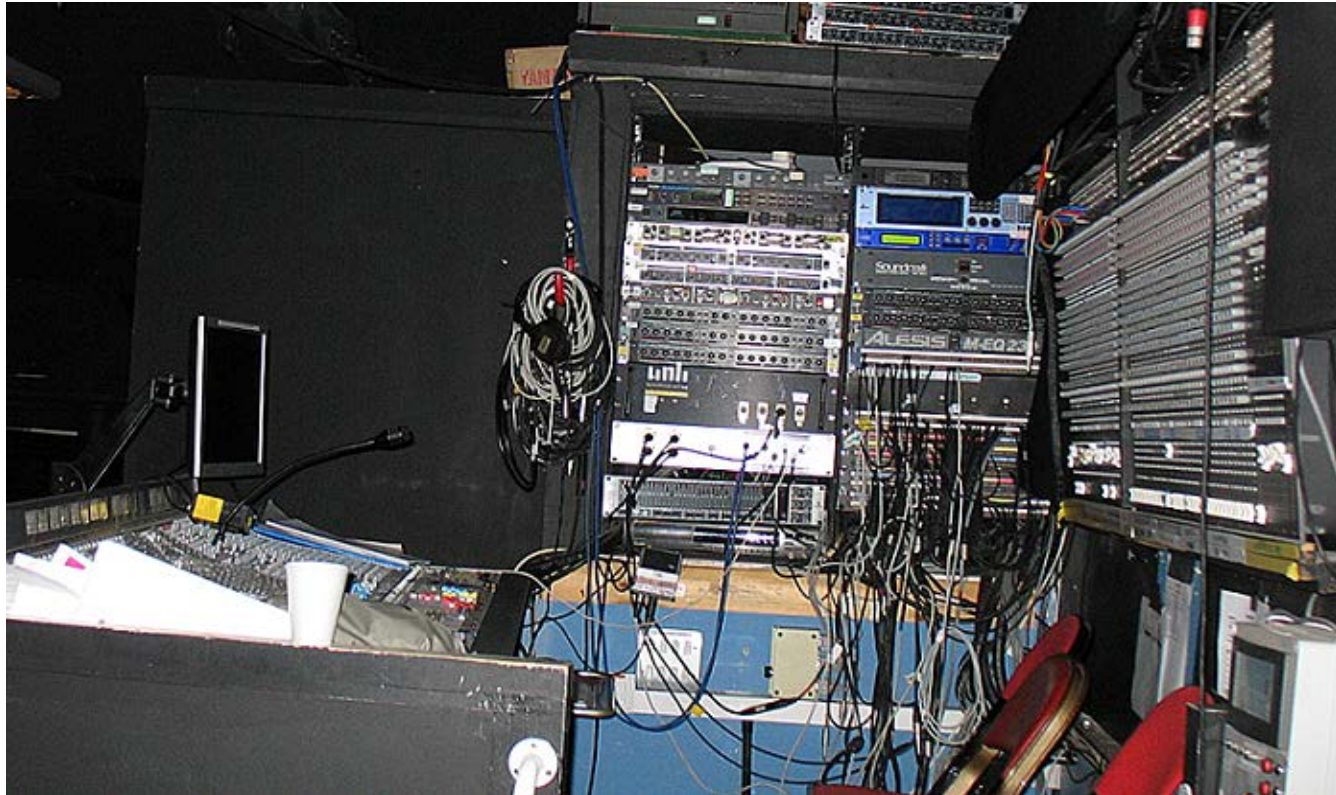
Day 5 Part 4

- ◆ This setup is confusing, even for a veteran like myself, but I do understand why a church allows things like this. With a newly re-configured sound system, some of this mess can go away.



Day 5 Part 4

Remember that the acoustical performance of a Sanctuary is a moving target. Air temperature, humidity, eddy currents of warm and cold air from people, lighting, windows and HVAC can change the performance of a sound system in a fraction of a second making the acoustics in most churches unstable. Many times we turn to active technology to solve problems that can only be corrected with passive physical intervention.



Day 6

- ◆ By the end of day 6, 90% of the tubes were installed in phase one of this project.



Day 7

- ◆ The church ask the youth people, members and students to help out. Painting was still going on just hours before the first evening worship service.



Day 7 Part 2

- ◆ The finished tubes are later to be hidden behind curtains.
 - ◆ Curtains have no impact on the frequencies the diffusers are used to manage.
- ◆ The tubes are different sizes. Although they look to be in a random pattern, they do follow a specific prime number sequence that is unique to this room. This pattern may never be used again.



Day 7 Part 3

- ◆ With just minutes before the first worship service, details like the flags and tube up in the trusses were already completed – a big Thank you to all of the terrific church member that helped out.



Day 7 Part 4

- ◆ First Service.
- ◆ The choir was too loud – un-amplified – never a problem before. Only a few overhead mics were used for recording purposes. Most of those mics will soon leave.



Day 7 Part 5

- ◆ As people were coming in, there were still people rushing to make sure the last details were taken care of.
- ◆ There is still a lot to do, but this is the biggest and most important change. Without it, changing the sound system would have been pointless.
- ◆ For me, a successful project has to have 3 elements. Good Sound System, Good Acoustics and great people who are willing to do what it takes to give everyone a wonderful worship experience and message.



Day 7 Part 6

- ◆ I also like to leave a church looking like I wasn't there.....



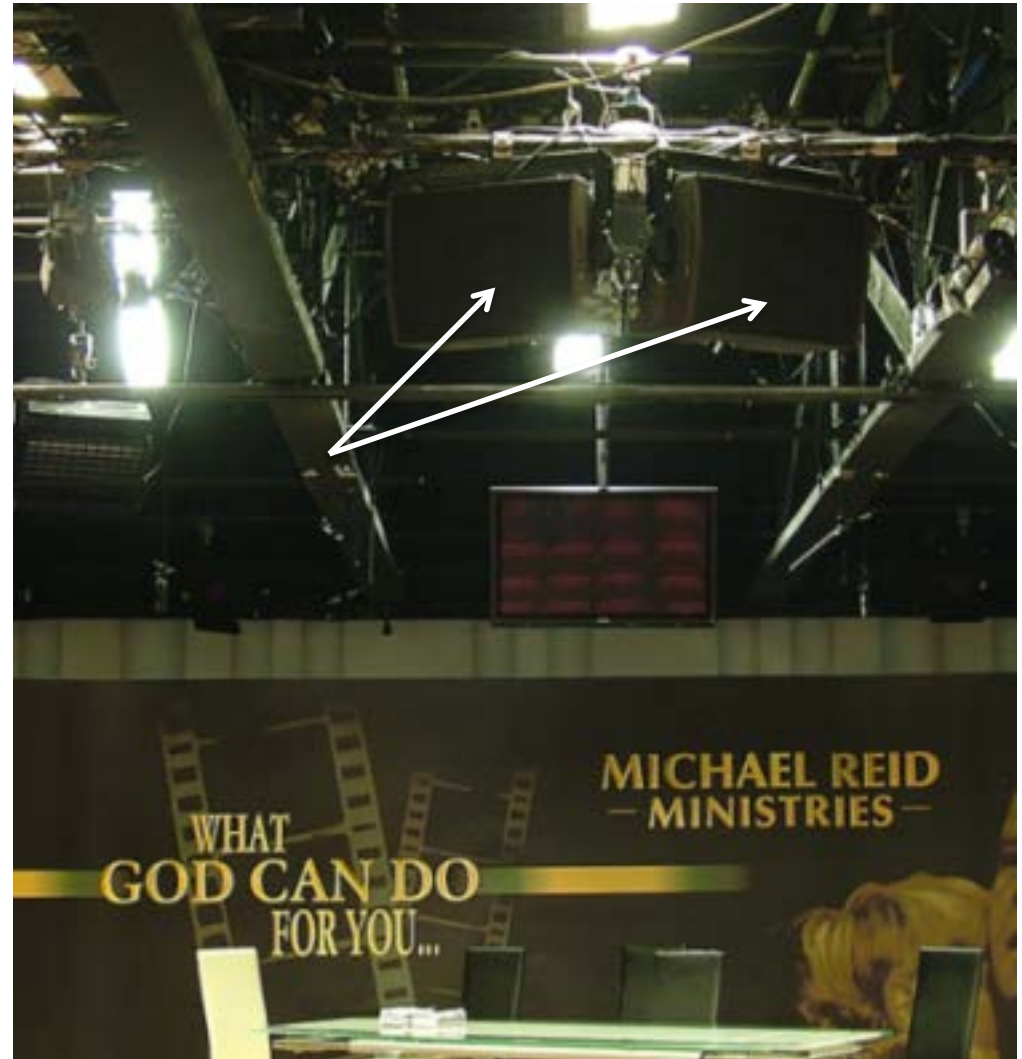
Other Projects

- ◆ For those of you who would like to see my work, your out of luck.
- ◆ Many churches are able to hide my work.
- ◆ You can hear the result, but you often can't see it.
- ◆ This is John Hagee Ministries (Cornerstone Church Texas) Seating over 3,000 and you can not see any of the hundreds of cardboard tubes.



Update 4 months later

- ◆ TV Monitors are replaced with flat screen monitors.
- ◆ The new larger TV monitors reduced the number of monitors needed.
- ◆ The existing new sound system was reinstalled.
- ◆ Two of the 5 speakers are just ahead of the TV monitor



The Music Booth



◆ Now you see a glass booth



- ◆ Now you Don't
- ◆ When you fix a church to worship quality, drum booths are usually not needed any more

5 Month update

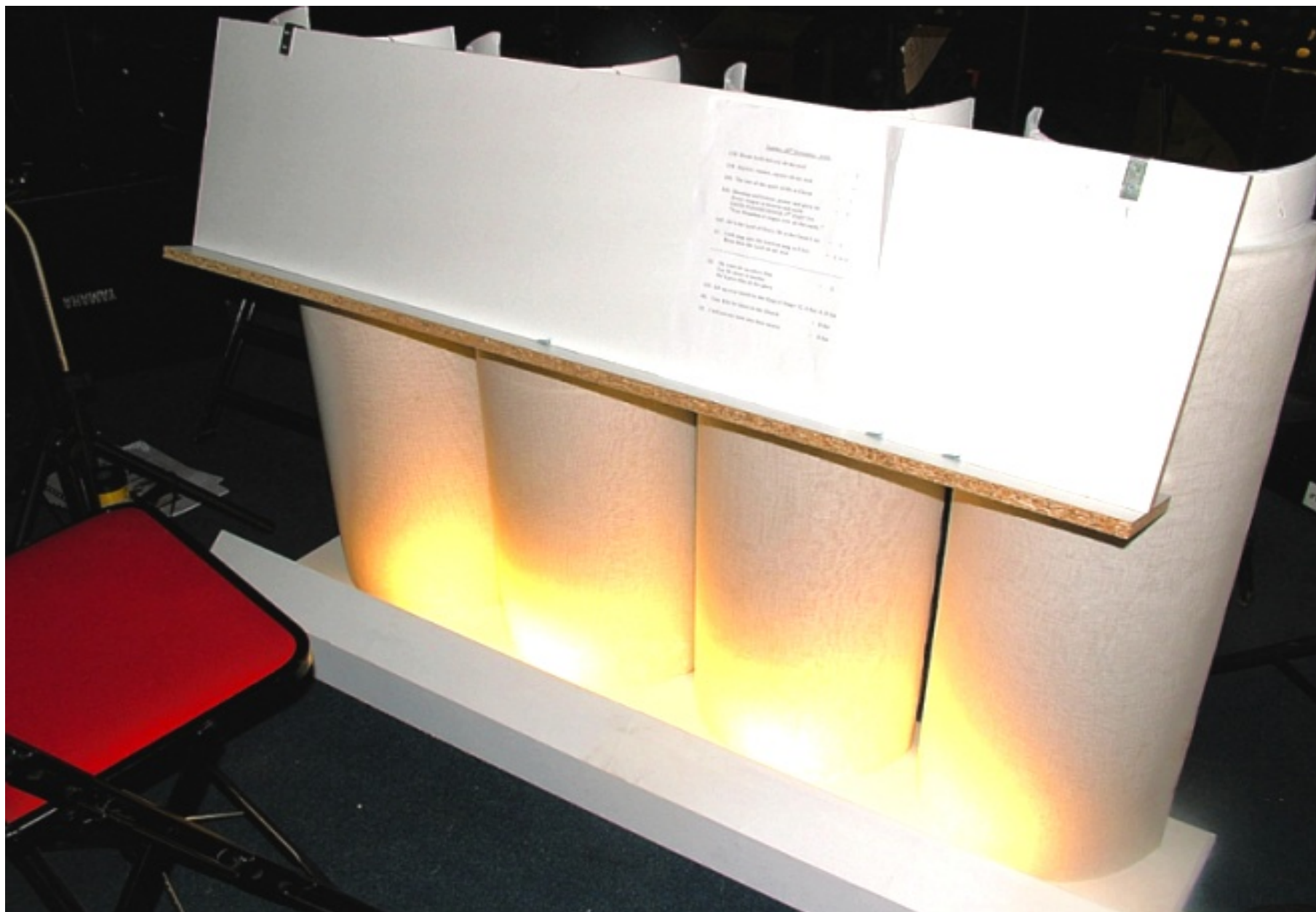
◆ True Story

- ◆ During one of the worship services, the handheld wireless mic the Pastor was using had a battery failure. The Pastor was unaware that the microphone was down and just carried on as nothing had happened.
- ◆ When the microphone failed the minister just kept on using it as nothing had happened.
- ◆ The audience was not aware of the problem as they were able to hear the minister just fine.
- ◆ The message was recorded with an audience mic instead.
- ◆ Before I was hired, I told the church that their minister would be able to preach with a slightly raise voice to a room full of people without a sound system. They did not believe this was possible. They just wanted the room fixed good enough for the sound system to work.
- ◆ The thing is, when you fix a room **properly** just for the sound system your fix should be for everything else too. If that does not happen, then the fix is incomplete and all you most likely have done is exchange one set of problems for another.

6 Month update



- ◆ After I left England, there were some loose ends that needed to be done. One of them was some extra control of the brass instrument. This is a low profile musicians diffuser trap on one side.



◆ And on the other side it is a music stand. Can we say Lawrence Welk?



- ◆ This is a divider between the choir and brass. It is an interested way to dress up the tubes. All of the lighting is low voltage.



- ◆ This is a view of the orchestra area. Now it is more organized and spill of their sound to the choir has a better balanced for the live sound and the TV broadcast.



- ◆ Christmas is a big event for most churches to make lasting impressions on new comers. This church is looking less and less like a barn and more like a church.



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Serving the church community exclusively since 1981